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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/722,724	11/25/2003	Peter G. Borden	BOX004-1C US	7346
34036	7590	06/10/2004	EXAMINER	
SILICON VALLEY PATENT GROUP LLP 2350 MISSION COLLEGE BOULEVARD SUITE 360 SANTA CLARA, CA 95054			ROSENBERGER, RICHARD A	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 06/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/722,724

Applicant(s)

BORDEN ET AL. 

Examiner

Richard A Rosenberg

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 April 2004.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 28-41 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☒ Claim(s) 28-37 is/are allowed.  
6) ☒ Claim(s) 38-41 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 4/23/04.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

1. This application is identified as a continuation application of copending application 10/269,619 and as series of parent applications to that application back to application 09/095,804, now Patent 6,049,220. However, it appears that what is claimed herein is not disclosed in those earlier applications and that this is not properly a continuation of those applications in that this does not present the same material as presented in those earlier applications. Correction of the continuation status is needed.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 38-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maris (US 5,706,094).

The reference, in column 3, lines 12-18, discloses a previously known method in which

[s]hort light pulses (duration 100 psec or less) have been used to heat a metal film on a semiconductor dielectric substrate. A time-delayed probe pulse (duration also 100 psec or less) is used to measure the change in the optical reflectivity of the metal film, and from this change the rate at which the film cools by thermal conduction into the substrate can be determined.

This meets the following language of claim 38

[a] method for determining a property of a portion of a substrate, the method comprising: heating a region of conductive material in the substrate ...; measuring a change in reflectance of the region ..., and using the change in reflectance ..., to determine an indication of thermal conductivity of a dielectric material in contact with the conductive material.

The reference also teaches a method for making such measurements in the region “comprising heating a region of conductive material in the substrate using power modulated at a frequency ...” and “measuring a change in reflectance of the region at the frequency of modulation of the power of heating”. See the device of figure 1, for example. The art does not specifically use the language that the pulses be chosen “to be sufficiently low to ensure that at least a majority of heat is transferred out of the region by diffusion rather than by a thermal wave”. The instant disclosure states, that for the sort of materials disclosed herein as being of interest, this chosen frequency will be less than about 6000 Hz, see the instant specification, page 26, line 19 and instant claim 29. In discussing the disclosed device, the reference teaches that “the pump pulse train may be intensity modulated at a rate of 1 Hz to 100MHz” (column 10, lines 24-25), which includes the claimed range of frequencies which are “sufficiently low to ensure that at least a majority of heat is transferred out of the region by diffusion rather than by a thermal wave”, which is, reading the claim language in light of the instant specification, less than about 6000 Hz.

The reference discusses using a computer to interpret the results; see computer 96 in figure 1B. It would have been obvious to us a computer to perform the calculations needed to determine the thermal conductivity of the dielectric material in contact with the conductive material as stated as known in the reference.

The reference discloses heating a metal film on the substrate for the determination. The use of either a unpatterned or a plurality of metal lines for the disclosed metal film would have been obvious. Making the measurements at different powers to use different degrees of heating in order to better characterize the thermal diffusion by obtaining several data points would have been obvious.

4. Claims 28-37 appear to be allowable. The art does not appear to teach or fairly suggest heating a region of a metal layer at a “frequency that is predetermined to be sufficiently low to ensure that at least a majority of heat is transferred out of the region by diffusion rather than by a thermal wave” and using a measured reflectance change due to this heating to “determine a measure of electrical conductance of a feature formed by patterning the metal layer” as claimed.

Rosencwaig et al (US 4,679,946) teaches that it is known in the art that thermally induced changes in reflectivity can be used to determine electrical conductivity of a metal sample; see column 16, lines 16-10 of that reference. The

method taught by that reference uses a modulation frequency of “from 0.1-20 MHz” (column 10, line 10, column 12, line 23).

The instant specification states that the claimed frequency range is in the range of less than 5985 Hz, see page 26, lines 19 and 20, which give frequencies of 5985 Hz and 5525 Hz, and claim 29, which claims the frequency is less than 5985 Hz. Other disclosed frequencies are even less; the example given on page 25, line 25 of the instant specification is 1000 Hz, and page 26, line 11 gives examples of 1430 Hz and 1080 Hz. This disclosed and claimed range is substantially outside of the range taught in the Rosencwaig reference.

Although the Maris et al reference (US 5,706,094) teaches that in a similar measurement the modulation frequency can be as low as 1 Hz (column 10, line 24 of that reference), it is a different test that does not measure a metal sample and does not “determine a measure of electrical conductance of a feature formed by patterning the metal layer” as claimed. There appears to be no particular reason in the art to modify the test of Rosencwaig et al to the substantially lower modulation frequency claimed herein.

5. The references on the information disclosure statement filed 23 April 20004 which have been lined through were not considered because no copy was present in the file or otherwise readily available.

6. Papers related to this application may be submitted to Group 2800 by facsimile transmission. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The fax number is (703) 872-9306

Any inquiry concerning this communication or earlier communications from the examiner should be directed to R. A. Rosenberger whose telephone number is (571) 272-2428. The examiner's normal working hours are Monday through Friday, 8:00 AM to 4:30 PM.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0956.

R. A. Rosenberger  
4 June 2004



Richard A. Rosenberger  
Primary Examiner